time. Such equipment and systems must be supported with sound preventative maintenance and spare parts availability. Accurately predicting a component failure rate is required to establish a cost efficient and effective critical spare parts inventory.

The failure rate of the part can be determined from the historical reliability data for the component. Analysis of equipment component failures, equipment maintenance history, equipment in-service duty and equipment in-service performance can be used to estimate a failure rate. Equipment that is new or no historical operational data is available, information regarding the component availability should be obtained from the equipment manufacturer, from other utilities, utility associations or sources. Experience with similar equipment placed into service under similar operating conditions may provide information regarding component rate failure predictability.

A failure rate must be determined and established for any in-service component or part that is to be supported by a critical spare. The failure rate is measured and quantified as a mean failure free operating time of the component or spare part. Operational performance records that include hours of failure free operating time shall be recorded for in-service components that are supported by a critical spare.

System Impact Criteria

The failure of critical spare parts could adversely impact system operating conditions causing service interruption to customers or diminished use or availability of the energy distribution system. Prolonged operation of the system in such a manner creates conditions that put customers at a high risk of having service interrupted. These operating conditions must be limited to minimum amounts of time. Accordingly critical spare inventories shall be established and maintained for components that may fail in service and result in the following conditions:

- loss of service to customers
- operating conditions that prevents compliance with ISO-NE / NEPOOL operating requirements
- energy delivery system being operated in a sub-optimal first contingency basis
- a mobile substation placed into service for a period of time greater than two weeks

Inventory Control Model

The on-hand quantity for a specific critical spare component shall be determined using an inventory control model criteria. The inventory control model establishes the critical spare stocking levels assuming an exponential distribution of failure free operating time, an exponential distribution of re-supply lead time, the quantity of in-service parts deemed to be classified as critical and an inventoried part availability service level of 95%.

The chart shown in FIGURE 1 establishes the inventoried quantity for a specified critical spare for the designated service level of 95%. The horizontal axis indicates the calculated ratio of the mean lead-time for re-supply or acquisition of a critical spare to the failure free operating time of an in-service critical component. The mean lead-time is the duration of time between the spare part order time and spare part receipt time. The Mean failure free operating time is the period of time between failures of a specific in-service component. The vertical axis indicates the number of critical components in-service.

The inventory model calculates and graphs a stepped boundary that separates the quantity of critical spares to be inventoried based upon a calculated spare part mean lead-time to mean failure free operating time ratio for a given number of in-service components.

The graph further indicates that the quantity of inventoried spares changes very little over a wide range of operating parameters such as part lead-time, component failure rates and in-service component quantities. A single graph can be used to establishing stocking quantities for many critical spares.

The graph depicts a simplified way in which to determine spare part quantities. The inventory model used to create the graph employs a complex set of calculations based upon exponential distributions around calculated means and probabilities that considered several occurring conditions. Several assumptions that were made when establishing this inventory control model. Most of the assumptions were conservative and were made to simplify the model. Assumptions

- A unit of in-service equipment utilizes critical spares in quantities of one. It is recognized that certain in-service equipment utilizes critical spares in quantities greater than one. The inventoried quantity for these critical spares must be adjusted to account for multiple component use by a single unit of equipment.

- All critical spares are acquired from a single supplier. No alternative supply of the part was considered such as an alternate supplier or borrowing the part from another utility.

- All failed components are to be discarded. No failed components were assumed to be refurbished and placed into inventory

- The model is based upon an in-service of equipment availability premise not a total down time cost premise that include transaction charges and inventory carrying charges.

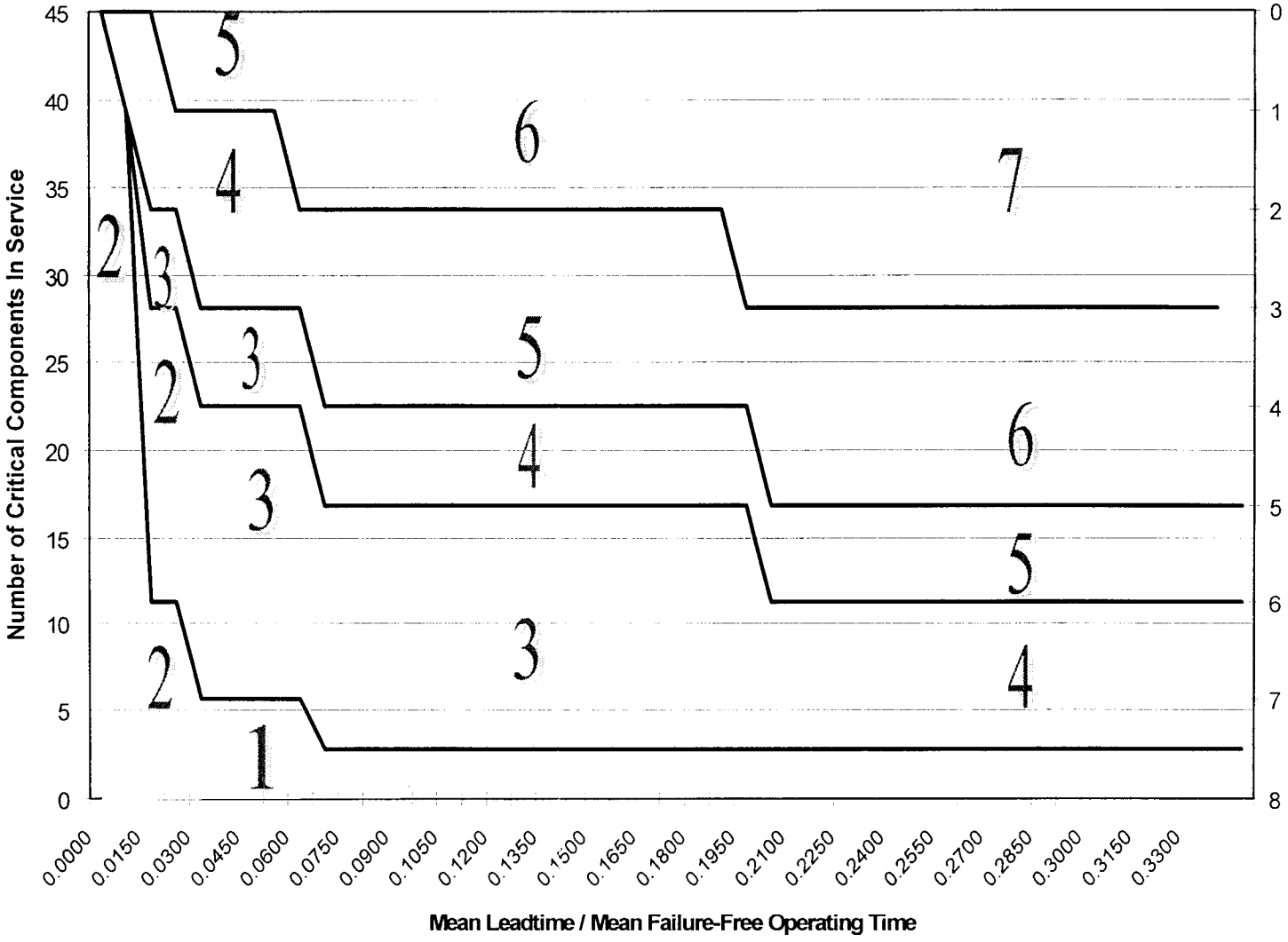
Number Of Spares For A Service Level Of 95%
Number of Critical Components In Service
45
40
35
30
25
20
15
10
5
0
0
1
2
3
4
5
6
7
8
5
6
4
7
2
3
3
5
2
3
4
6
3
5
2
3
4
1
0.0000
0.0150
0.0300
0.0450
0.0600
0.0750
0.0900
0.1050
0.1200
0.1350
0.1500
0.1650
0.1800
0.1950
0.2100
0.2250
0.2400
0.2550
0.2700
0.2850
0.3000
0.3150
0.3300
Mean Leadtime / Mean Failure-Free Operating Time

FIGURE 1

Fitchburg Gas and Electric Light Company

Customer Surveys: 2002*

Residential Customer Satisfaction - Random (Scale 1 - 7)

Response to the question: "Overall, how satisfied are you with the service you are receiving from Unitil/Fitchburg Gas & Electric?"
(Scale 1 - 7: 1-Dissatsified; 7-Satisfied)

Response Value	Number of Responses	Weighted Response
1	12	12
2	8	16
3	16	48
4	19	76
5	31	155
6	34	204
7	59	413
Total	179	924
Average		**5.2**

Customer Satisfaction - Specific (Scale 1 - 7)

Response to the question: "How satisfied were you with the service you received from our Customer Service Department?"
(Scale 1 - 7: 1-Dissatsified; 7-Satisfied)

Response Value	Number of Responses	Weighted Response
1	10	10
2	4	8
3	5	15
4	10	40
5	13	65
6	50	300
7	125	875
Total	217	1,313
Average		**6.1**

*Survey changes to conform to DTE requirements implemented during 2002.

Fitchburg Gas and Electric Light Company

CAIDI: 1996-2002

	TOTALS [1]	TOTALS With Adjusted Criteria [2]
Year	CAIDI by Year (min.)	CAIDI by Year (min.)
2002	94.60	87.53
2001	75.42	42.68
2000	134.32	85.56
1999	83.52	81.47
1998	97.75	88.13
1997	70.24	72.90
1996	312.93	66.14

[1] Includes all reliability data for 1996-2002.

[2] Equals TOTALS minus D.T.E. assumptions for calculating electric reliability measures.

Fitchburg Gas and Electric Light Company

Excludable Major Events: 2002

One Excludable Major Event, as defined by the Department's standard, occurred on August 16, 2002.

The details pertaining to the outage on August 16, 2002 are as follows:

Weather Conditions

On Friday, August 16, 2002, at approximately 6:30 p.m., severe lightning and heavy winds passed through FG&E's service territory. These dangerous weather conditions, that persisted on a sustained basis for approximately 30 minutes, resulted in a significant number of outages to customers in FG&E's service territory. It has been determined that the most damaging part of storm's path passed through the northern part of the FG&E territory, through the towns of Ashby and Townsend.

Outage Information

Outages were widespread on August 16, 2002, occurring in all four cities and towns within FG&E's service territory. The first report of no power was received at 6:47 p.m. in Townsend. Service restoration was complete on the primary system when the final trouble condition, a blown fuse feeding a tempo barn service, was repaired at 3:23 p.m. on August 17, 2002. In addition, several secondary drops had to be repaired, some of which were delayed due to the need for an electrician at the customer's premise. This work was completed at approximately 11:40 p.m. on August 17, 2002.

A total of 37 trouble conditions were attributed to the storm. These trouble conditions included 4 sections of downed conductors, 2 downed distribution poles, 1 bad disconnect swtch which tied circuits 01W06 and 50W55 in Fitchburg, 17 known fuse operations due to tree contacts and 7 fuse operations where no cause was found (probably tree contacts as well). Further, the storm caused outages on 16 distribution circuits. The outages associated with the lightning and wind produced by the storm, in total, generated 4270 customer outages, resulting in 796,006 customer minutes interrupted and an accumulation of 30.2 minutes toward FG&E's SAIDI performance measure. Because of the magnitude, severity and unusual characteristics of this particular weather event, it qualifies as an excludable event under the outage reporting guidelines.

Work Force

FG&E: The regular Night Trouble Worker was on his shift when the storm arrived and was the first to respond to the outages. Another crew was called for assistance and aid at 7:00 p.m., along with a substation worker. Additional assistance, regularly provided for Night Trouble, clocked in at 8:30 p.m.

Concord Electric Company: Concord Electric ("CECo"), FG&E's New Hampshire affiliate, provided a crew to assist FG&E in the restoration. The team arrived at about 12:30 a.m. on

August 17. A second CECo crew provided additional assistance to FG&E at 6:30 a.m. on August 17, 2002.

Tree Crews: Asplundh Tree Service, a professional vegetation management vendor, was dispatched by FG&E at approximately 9:30 p.m. on August 16, 2002. This first crew was delayed by police activity. Asplundh then dispatched another crew, which launched into service at 2:30 a.m. on August 17, 2002. This crew was assisted by a second Asplundh crew at approximately 6:30 a.m. on August 17, 2002.

Storm Statistics

From the inception of this powerful storm at 6:45 p.m. on the August 16, 2002 until midnight, 3,863 customers suffered outages. Between midnight and 6 a.m. on August 17, 2002, 799 customers remained without power. Between 6 a.m. and noon on August 17, 2002, 692 customers were without power. 301 of these 692 outages resulted from the failure of a tie switch used to transfer load between circuits during the storm restoration work. The remaining 39 customers were restored to service between noon and 3:23 p.m. on August 17, 2002.

The longest outage, a single temporary service to a barn, was initially reported out at approximately 6:50 p.m. Restoration to this service occurred approximately 20.5 hours later.

In addition to the primary circuit outages, several service drops had to be repaired. This work continued unabated until completed at 11:40 p.m. on August 17,2002.

Unitil

Operations Bulletin #OP5.00

Subject: Vegetation Management

Effective: January 1, 2001

Issued by: *G. Appleton*
Content Team: *S. Balch, R. Abel, S. Wade , R. Letourneau, Jr.*

1.0 Purpose

To establish a standardized vegetation management program for the Unitil system companies in order to insure consistency and the best practices approach in achieving reliable operation of the overhead T&D systems.

2.0 Scope

This bulletin applies to the vegetation management program for all Unitil electric energy distribution systems and provides the required guidelines, necessary standards, and performance measures necessary for a continuing assessment of the effectiveness of the program.

3.0 Table of Contents

4.0 Methods

Vegetation management methods apply to both Unitil's Transmission system and Distribution system. Transmission methods and frequency differ from distribution methods due to the fact our transmission system is, for the most part, off-road and located within rights-of-way. The topography, land-use, the company's rights, and the fact our transmission system is the backbone of a reliable energy delivery system dictate more aggressive trimming methods and also various types of vegetation control. The Distribution methods, although not as aggressive as Transmission, still require minimum line clearance specification, however with less variation in trimming methods. The following sections describe approved methods of vegetation control.

4.1 Transmission Vegetation Control

Transmission vegetation control is defined as the process and methods utilized to maintain the company's rights-of-way. Because the transmission system is an integral component of a reliable energy delivery system, and because of the higher voltages of our transmission lines, tree and limb contact must be completely eliminated through inspection and trimming programs. The higher voltages are less tolerant to tree and/or limb contact and added clearance is preferred. Added clearance is also preferred to speed transmission foot patrols during routine maintenance inspections or during outage situations where a fault has occurred and the ability to quickly isolate the fault is necessary to sectionalize the line or begin immediate repair work in order to minimize outage time to our customers.

Several methods will be described in this bulletin. Although not any one single method is the most effective, the distribution company shall endeavor to deploy the most efficient and effective method of vegetation control based upon the topography of the land, types of vegetation in terms of growth rates, the company's rights, state and federal law, and any other regulations which may apply.

4.1.1 Transmission Cycle

Transmission vegetation control shall be completed on a 5-year cycle. This results in the maintenance of one-fifth of the transmission system on an annual basis. The determination of the amount of trimming may be calculated based upon the pole miles of transmission line or acreage. Since many of our rights-of-way have more than one line, and because many rights-of-way can accommodate more than the existing facilities, the preferred unit of measure shall be acres. The acres unit of measure accommodates varying line configurations as well as varying widths of right-of-way. Therefore all planning and reporting of transmission vegetation control shall utilize acres as the standard unit of measure.

4.1.2 Selective Trimming

Selective trimming is defined as tree removal in the transmission right-of way employing conventional methods. Conventional methods include the identification of the tallest vegetation within the right-of-way and removal of such vegetation utilizing various saws and chippers/shredders. This method has several benefits including no restrictions on topography since personnel often walk the right-of-way, transporting all the required equipment by hand.

4.1.3 Herbicide Applications

The spraying of herbicides by certified contractors has shown to be a cost effective vegetation management tool. Increased regulation in this area has resulted in an increased administrative burden. However at this time the additional responsibilities have not outweighed the resulting benefits. Therefore this method continues to be a preferred method of transmission vegetation control for Unitil Companies.

Careful planning and accurate records are required in order to properly execute a successful herbicide program. Knowledge of federal and state laws as well as local ordinances need to be researched to determine proper application. Because laws between Massachusetts and New Hampshire could vary, this Operations Bulletin will not address one specific method. Instead the bulletin will outline the steps currently utilized by one New Hampshire DOC. These steps are as follows:

1. Obtain herbicide permit from the NH Department of Environmental Services. This is the responsibility of the certified contractor performing the spraying.
2. By means of certified mail, notify the selectmen, mayor, or town manager in the city or town where the rights-of-way are located.
3. Notification to the public through the use of notices in one newspaper of statewide circulation and in all newspapers of local circulation.
4. Notification through billing stuffers, by telephone, or in person each abutter along the right-of-way where herbicides are to be applied. Abutters shall be offered alternative vegetation management, i.e. mechanical clearing. This is New Hampshire state law (RSA 374:2-a) and the wishes of the landowner shall take precedence.
5. Posting signs every 200 feet along the perimeter of the right-of-way where herbicides are to be applied.

New Hampshire State law further stipulates the format of the newspaper advertisements, including specific information required for publication as well as a requirement that the advertisement be a "coupon" that may be clipped and mailed back to the utility.

The information provided in this Operations Bulletin shall be used as a guideline and is **not intended to be all-inclusive.**

Herbicide applications are not practical for all applications. For example, rights-of-way that include a large percentage of farmlands, or rivers/streams would not be conducive to herbicide use. However for many applications, herbicide use continues to be an efficient, cost-effective method of controlling growth along Unitil's rights-of-way.

4.1.4 Mowing

The mowing of transmission rights-of-way is defined as the mechanical removal of vegetation using various motorized apparatus that may be attached to off-road equipment. The topography must be free of rivers and large streams since the equipment is unable to cross such obstacles. Several vendors have become proficient in this method and Unitil has contracted with them with favorable results.

4.1.5 Side-Cutting

Side cutting is defined as vegetation control at the edge of the right-of-way. Side cutting shall be utilized in conjunction with other forms of vegetation control and is therefore not a practical transmission vegetation control method on a stand-alone basis. In other words, side–cutting supplements transmission vegetation control methods utilized to control vegetation within the right-of-way.

Tree limbs that grow from outside the actual right-of-way can jeopardize the integrity of the transmission system and therefore must be removed. Furthermore, dead and danger trees also pose risks. Dead trees may fall into adjacent trees at the edge of the right-of-way, leaning towards the transmission line posing a threat to the transmission line itself. Danger trees, defined as dying trees that have weak limbs or trunks, may also pose similar risks. Side cutting is designed to eliminate these threats.

4.2 Distribution Vegetation Control

Distribution vegetation control is defined as the systematic removal of vegetation growth along Unitil's distribution circuits. The majority of distribution circuits are along the roadway and unlike transmission methods, distribution methods are not as varied and are usually performed from a bucket truck using various sawing techniques. In addition to trimming trees, the identification and removal of danger trees is also a significant part of vegetation control.

Distribution vegetation control shall be scheduled by circuit and voltage class.

Conductor clearances detailed within the specification shall be strictly followed. However, it is recognized that, from time to time, proper permissions may not be granted from property owners. In addition, scenic road designations may preclude the achievement of specified clearances. Permission problems and/or scenic road designations shall be well documented on daily timesheets (See Section 6.3, Performance Metrics) for auditing purposes.

4.2.1 Distribution Cycle

Distribution vegetation control shall be completed on a cycle according to the following table:

Voltage Class	Cycle
4 kV	8 years
13.8 kV	5 years
34.5 kV	4 years

The determination of the amount of trimming shall be calculated based upon the pole miles of distribution circuits, by voltage class, excluding secondaries and services. These figures shall be determined based upon the annual statistical report compiled by individual distribution operation centers (DOCs).

4.2.2 Danger Trees

Danger trees are defined as dead or dying trees that pose a threat to distribution circuits upon their failure. These dead trees or limbs may break away at any time, fall into the circuit and result in damage to our facilities. Managing dead trees requires identification and removal at the earliest possible stage. Methods for removal include flat cutting the entire tree or removal of the problem branches. The objective is to ensure that if the tree failed, the integrity of the distribution circuit will be maintained.

Third party participation shall be pursued in all danger tree removals prior to commencement of the program. Participation is based upon the current Intercompany Operating Procedure as detailed in Section 4.2.5 of this Operating Bulletin. Reimbursement provides significant payment to Unitil allowing for further funding of the Vegetation Management Program. Refusal of participation shall be properly documented.

4.2.3 Maintaining Services

Service shall be reviewed for trimming on the same cycle and concurrently to the distribution primary circuit. Services and secondary pole lines shall not be trimmed unless a tree/branch is directly in contact with the conductor. For the purpose of record keeping and metric evaluation, services and secondary pole lines trimmed shall be categorized as unscheduled work.

4.2.4 Customer Trimming Requests

Customer requested service trimming requires careful assessment and management. These requests, if not handled properly, may result in a significant resource commitment both in terms of dollars and administrative labor without a proportional benefit to outage and/or damage prevention. In addition, improperly managed requests may result in negative customer sentiment.

Each request shall be individually reviewed in the field after a discussion with the customer reveals that a potential problem exists. Only those services that have significant contact with vegetation and/or are in harms way due to danger trees shall be trimmed. All other service shall not be trimmed. The customer shall receive notification as to the position of the company and shall also receive a complete explanation as to the decision.

4.2.5 Intercompany Operating Procedures

The purpose of the Intercompany Operating Procedure is to establish a definite method of allocating costs of trimming associated with both construction and maintenance of joint pole lines.

Maintenance trimming shall be done on a joint basis. When it is agreed both parties will benefit, the division of costs shall be 75% Unitil and 25% telephone.

Heavy storm work shall be handled immediately without prior review. The parties agree to a reciprocal acceptance of each other's tree contractors for heavy storms on a 50%/50% basis, provided field representatives, as soon as practicable after a major storm, meet to communicate cities/towns, streets, and lines trimmed as a result of said storm. Subsequent bills to include the same information.

Lastly, removal of danger trees including large limbs that threaten both parties' facilities shall be removed on a 50%/50% basis, subject to prior field review wherever possible (see Section 4.2.2 of this Operating Bulletin).

5.0 Standards

Standards refer to required conductor clearances relative to vegetation growth. In all cases these standards shall be realized unless designated scenic roads and /or appropriate permissions from landowners can not be obtained.

6.0 Performance Metrics

In order to measure the effectiveness of the trimming program, data shall be collected on a continuous basis and performance metrics shall be calculated and published, by DOC, on the Operations Systems web page. Comparative analysis shall allow for continued improvement in vegetation control methods and techniques. Responsibility for the collection of data, accurate and timely reporting, and comparative analysis shall rest with the DOC's respective Safety and Facilities Coordinator. Performance metrics shall be updated no less than once per month.

6.1 Effectiveness Measures

In order to monitor the effectiveness of the transmission trimming program, each DOC shall record the **total number of momentary or permanent outages** experienced on our transmission system on a monthly basis. Only those momentary and permanent outages related to tree or limb contact are utilized for this metric. Additionally, only those trees and limbs that are within the trim zone shall be included. The metric is expressed as follows:

Transmission Effectiveness = Total number of momentary or permanent outages

The logic behind the measure is that an effective transmission trimming program shall have the objective of minimizing these types of interruptions.

In order to monitor the effectiveness of the distribution trimming program, each DOC shall record the **number of tree-related outages, by voltage class,** on a monthly

basis. This number shall be divided by the **total number of pole miles per respective voltage class** in the DOC as described in Section 4.2.1. The quotient, expressed as follows, shall comprise the effectiveness measurement for distribution vegetation control:

$$\textbf{Distribution Effectiveness} = \frac{\textbf{Number of tree-related outages (by voltage class)}}{\textbf{Total number of pole miles (by voltage class)}}$$

The logic behind the measure is that an effective trimming program shall have the objective of minimizing tree-related outages.

6.2 Efficiency Metrics

Efficiency metrics are designed to compare costs and ensure that resources are deployed in a manner that achieves the greatest amount of trimming for the dollars expended.

For Transmission efficiency, each DOC shall record **dollars expended** and **acres maintained**. The quotient, expressed as follows, shall comprise the effectiveness measurement for transmission vegetation control:

$$\textbf{Transmission Efficiency} = \frac{\textbf{Total dollars expended}}{\textbf{Total acres maintained}}$$

For Distribution, each DOC shall record **dollars expended** and **sections of primary conductor trimmed**. The quotient, expressed as follows, shall comprise the effectiveness measurement for distribution vegetation control:

$$\textbf{Distribution Efficiency} = \frac{\textbf{Total dollars expended}}{\textbf{Number of sections trimmed}}$$

The **number of sections trimmed** shall also include services. In other words, one service is equal to one section.

The logic behind this measurement is that the most efficient crews shall be more productive and able to achieve the lowest cost per section of circuit trimmed.

6.3 Daily Timesheet Information

All vendors performing maintenance or construction trimming shall complete daily timesheets.

This timesheet is designed to collect the necessary data that will be utilized to process vendor invoices and to calculate performance metrics. It shall be the responsibility of the Manager, Electric Systems to ensure the timesheets are completed daily, and that all required information is included.

Information on the daily timesheet includes:

General Information:
- Date
- Street
- Town
- Circuit
- Voltage

Pole Numbers
- Company pole number
- Telephone pole number

Quantity of work:
- Number of sections trimmed
- Number of services trimmed

Type of work:
- Scheduled work
- Unscheduled work
- Construction related
- CWO number
- Storm work
- Other trouble
- Customer Trim Request

Type of Clearing:
- Trees trimmed – L (light), M (medium), H (heavy)
- Ground Cut
- Dead/Hazardous trees or limbs removed

Type of Construction:
- 1 – Single Phase, 2 – Two Phase, 3 – Three Phase
- Secondary Only
- Service Only

Time:
- Labor
- Equipment/Vehicle

Telephone Participation

- 75/25
- 60/40
- 50/50
- None

6.4 Monthly Reports & Map Updating

Monthly progress reports shall be available on the Operations System web site. These reports shall provide specific information regarding the status of individual DOC vegetation management programs. Information shall include annual schedules for transmission and distribution programs, scheduling status, and performance metrics. The report will be completed by individual DOC and then rolled into one single, Unitil system report.

It shall be the responsibility of the Safety & Facilities Coordinator to update the Operations System web site no less than once per month.

In addition, each DOC shall utilize circuit maps as a means to track circuit trimming. These maps shall detail the specific locations that our facilities were trimmed along with appropriate dates. These maps shall remain on file for at least one complete cycle.

6.5 Supervision

The Safety & Facilities Coordinator shall be responsible for developing schedules and monitoring the progress of said schedules. The Manager, Electric Systems, shall be responsible for monitoring the efficiency and effectiveness of the contract crews, ensuring that their productivity and quality are as expected.

Any knowledgeable DOC employee may perform monitoring of the contract crews. Monitoring includes live field visits and post-audit inspections. The results of these field visits and audits shall be reported to the Manager, Electric Systems.

7.0 Budgeting Criteria

Transmission and Distribution Trimming budgets shall be completed annually based upon the scheduled cycle, volume of trimming, as well as an estimate of unscheduled work. On an annual basis, Unitil engineering shall review circuit reliability and provide each DOC with recommendations for circuit trimming. This analysis includes a review of trouble reports in order to identify problem areas with the ultimate objective of improving the System Average Interruption Duration Index, or SAIDI. This analysis shall be completed during the annual capital budgeting process. The DOC shall

endeavor to complete the identified trimming projects as early as possible in the fiscal year so that the SAIDI benefit may be realized as soon as possible.

7.1 Annual Costs

Annual costs shall be based upon the volume of work required for that cycle year and the amount of expected trimming, including both scheduled and unscheduled work. Either acres (for Transmission) or pole miles (for Distribution) shall be utilized in conjunction with the costs recorded for the performance metrics detailed in Section 6.0. It is also necessary to pre-select trimming methods, i.e. side-cutting, herbicide application, mowing, etc., before commencement of a budget.

7.2 Determining Volume of Work

In order to determine the volume of work, the amount of vegetation growth needs to be established. The type of clearing (Light, Medium, and Heavy) can only be determined by field inspection. Prior to budgeting, the areas to be trimmed shall be inspected to determine vegetation growth. The information from this inspection shall then be utilized to calculate required resources for the cycle year.

In an area where it is anticipated that work shall be placed out to bid, Unitil shall endeavor to perform such bidding in advance of the actual budgeting process. This will allow for more accurate budgeting.

7.3 Vendor Selection

Criteria for vendor selection shall be based upon cost and performance. It is also strongly recommended to select a vendor that is able to provide additional resources during storm events.
On an annual basis, Unitil shall solicit request for proposals from local tree contractors. These proposals shall include a listing of personnel and equipment, along with any ancillary services the vendor may provide. Other selection criteria include the safety record of the vendor and minimum insurance requirements as set fourth in Unitil Policies. The DOC management will then evaluate the proposal and select an appropriate vendor.

7.4 Competitive Bidding

Competitive bidding is an effective method for performing either maintenance trimming or construction trimming. Not all work is conducive to bidding. In most cases, the best utilization of competitive bidding is for work that is confined to a definitive scope. Work included is this is as follows:

- Complete circuit trimming
- Off-road trimming
- Long line extensions along public way
- Major system improvements such as voltage conversions
- Specialty trimming (mowing, herbicide application)

7.5 Hot Spot Trimming

From time to time "hot spot" trimming (unscheduled work sections) is required due to tree contact and or multiple outages as a result of tree contact. This usually happens off cycle as a result of increased vegetation growth or non-compliance with standards during normal cycle maintenance.

It is important that hot spot trimming is carefully managed as this practice is inefficient and results in increased costs. It is recognized that hot spot trimming is a necessary part of vegetation control, but it's use shall be minimized to the extent possible.

Fitchburg Gas and Electric Light Company

Poor Performing Circuits: 2002

2002 Worst Performing Circuits (with exclusions taken) [1]

Circuit Location	Circuit #	2002 CIRCUIT TOTALS - With Exclusions Taken SAIDI (min.)	SAIFI (min.)	Reason why circuit performed poorly	Improvement Steps	# of years performed poorly
Beech St., Fitchburg	01W06	435.12	4.714	Primary causes were tree/limb contacts.	Circuit feed changed in 2002 to a different source to minimize the number of outages. Fault indicators installed in 2002 to assist in fault finding.	1
Poplar St., Fitchburg	05H12	124.74	2.338	Primary causes were defective equip., animal & tree/limb contact.	Additional protective devices installed in 2002 to reduce the number of customers affected per outage. Hot spot trimming in 2002.	3
Main St., Townsend	15W16	349.72	4.507	Primary causes were vehicle & tree/limb contacts.	2002 Budget Item # DRB03 - Reliability Project to reinsulate circuit 2003 Budget Item # DPB03 - Install distribution capacitors Scheduled to be trimmed 2003.	1
Nockege Rd., Fitchburg	20H22	364.22	2.402	Primary causes were defective equip., vehicle, lightning & tree/limb contact.	2003 Budget Item # DPB08 - Replace distribution airbreak switches. 2001 Fuse additons and replacements. Trimmed 2001.	2
Nockege Rd., Fitchburg	20H23	0.00	0.000	Primary causes were vehicle and defective equipment.	Budget Item # DRB04 - Reliability Project Circuit has been eliminated and is now part of 20H24.	2
Nockege Rd., Fitchburg	20H24	540.05	3.004	Primary causes were defective equip.& tree/limb contact.	2003 Budget Item # DPB09 - Elminiate unshielded cable. Trimmed 2001.	3
Rte 2A, Lunenburg	30W30	270.17	3.061	Primary causes were lightning, vehicle, animal & tree/limb contact.	2003 Budget Item # DRB04 - Install additional reclosers and increase the number of fuses on circuit 30W30. Scheduled to be trimmed 2004.	2
Rindge Rd., Fitchburg	35H36	388.70	3.767	Primary causes were vehicle and animal contact.	Animal guard survey and installation Partially trimmed in 2002.	1
Main, W. Townsend	39W19	598.19	6.283	Primary causes were defective equip. & tree/limb contact.	2002 Budget Item # DRB06 - Add Reclosers and increase quantity of fuses. 2003 Budget Item # SPB05 - Replace 69 kV lightning protection Trimmed 2002 - 2003.	3
Summer St., Fitchburg	40W38	402.90	7.000	Primary causes were defective equip. & animal contact.	2002 Budget Item # TPB03 - Replace 69 kV Pin & Cap Insulators 2002 Budget Item # TPB04 - Rebuild Transformer to add LTC 2002 Budget Item # DPB04 - Install neutral conductors 2003 Budget Item # TPB04 - Add directional relaying to transformer Trimmed 2002. SCADA installed in 2002	1
Summer St., Fitchburg	40W39	191.32	11.600	Primary causes were defective equip. & animal contact.	2002 Budget Item # TPB03 - Replace 69 kV Pin & Cap Insulators 2002 Budget Item # TPB04 - Rebuild Transformer to add LTC 2002 Budget Item # DPB04 - Install neutral conductors 2003 Budget Item # TPB04 - Add directional relaying to transformer Trimmed 2002. SCADA installed in 2002	1

[1] In accordance with D.T.E. Order 99-84 Attachment 1, Page15, Section VIII., Item G.